

Notice of Allowability

Application No.

10/706,777

Examiner

Henry S. Hu

Applicant(s)

RISTIC-LEHMANN ET AL.

Art Unit

1713

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to RCE of January 11, 2006.
2. ☒ The allowed claim(s) is/are 1-4,6-9,11,12,14,16 and 17.
3. ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
 - a) ☐ All b) ☐ Some* c) ☐ None of the:
 1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

* Certified copies not received: _____.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.

THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.

4. ☐ A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.
 5. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
 - (a) ☐ including changes required by the Notice of Draftsperson's Patent Drawing Review (PTO-948) attached
 - 1) ☐ hereto or 2) ☐ to Paper No./Mail Date _____.
 - (b) ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date _____.
- Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).
6. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

Attachment(s)

1. ☒ Notice of References Cited (PTO-892)
2. ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3. ☐ Information Disclosure Statements (PTO-1449 or PTO/SB/08),
Paper No./Mail Date _____
4. ☐ Examiner's Comment Regarding Requirement for Deposit
of Biological Material
5. ☐ Notice of Informal Patent Application (PTO-152)
6. ☐ Interview Summary (PTO-413),
Paper No./Mail Date _____
7. ☐ Examiner's Amendment/Comment
8. ☒ Examiner's Statement of Reasons for Allowance
9. ☐ Other _____

DETAILED ACTION

1. This Office Action is in response to faxed **RCE Amendment** filed on January 11, 2006. With the Applicants' amendment mainly based on Interview Summary of December 21, 2005, **Claims 1-3 were amended; Claims 5 and 10 as well as non-elected Claims 18-98 were all cancelled, while Claims 13 and 15 were previously cancelled.** To be more specific, parent **Claim 1** was amended to incorporate the weight ratio of Claim 5 and the PTFE particle size of Claim 10; Claims 1-3 as well as the paragraph in page 5 of specification were corrected with 298.15 K instead of 298.5 K for atmospheric condition as pointed out by Examiner. The examiner thereby withdraws the specification objection in the previous Final Office Action dated October 28, 2005.
2. The examiner **accepts Applicants' drawing in eleven sheets with Figures 1-10** filed on November 10, 2003 with this application (see Brief Description for figures on pages **9-10, 12 and 15-16**). **Claims 1-4, 6-9, 11-12, 14 and 16-17 are now pending** with one independent claim (Claim 1). An action follows.
3. The 102(b) and 103(a) Claim rejections under Final Office Action filed on October 28, 2005 are now removed for the reasons given in paragraphs 4-10 thereafter.

Allowable Subject Matter

4. Claims 1-4, 6-9, 11-12, 14 and 16-17 are allowed.
5. The following is an examiner's statement of reasons for allowance: The above Claims 1-4, 6-9, 11-12, 14 and 16-17 are allowed over the closest references:
6. *The limitation of twice-amended parent **Claim 1** of present invention relates to a material comprising (A) greater than or equal to about 40% wt aerogel particles and (B) less than or equal to about 60% wt polytetrafluoroethylene (PTFE) particles having a particle size of from about 50 nm to about 800 μ m as a binder, wherein the material is a powder or a putty, and the material has a **thermal conductivity of less than or equal to 25 milliwatt per meter Kelvin (mW/m K) at atmospheric conditions (298.15 K and 101.3 kPa)**. See other limitations of dependent **Claims 2-4, 6-9, 11-12, 14 and 16-17**.*
7. In view of Applicants' RCE amendment, parent composition **Claim 1** now carries a combination of limitations for making a composite material comprising two components as: (A) aerogel particles (≥ 40 wt%) and (B) polytetrafluoroethylene (PTFE) particles (≤ 60 wt%) having a particle size of 50 nm - 800 μ m to be useful as a binder. The key point is that such obtained insulation material is in the form of powder or putty, and the material has a **very low thermal conductivity of ≤ 25 milliwatt per meter Kelvin (mW/m K) at atmospheric conditions (298.15 K and 101.3 kPa)**. It is noted the open language "comprising" is used.

In a very close examination, current composition involves **two extra limitations** in comparing with original Claim 1. To be specific, a specific weight ratio is now set for aerogel particles (A)/polytetrafluoroethylene (PTFE) particles (B) as well as such an insulation product is previously required to be in the form of powder or putty.

8. As discussed earlier in 102(b) rejection, **Stepanian** may has disclosed a process for making **aerogel composite materials** comprising two different phases, one is a low-density “aerogel matrix” and the second is a reinforcing phase. **No weight ratio is disclosed.**

Although such a composite material may carry a thermal conductivity (12-15 mW/m K) falling within the claimed value range, **the final material will not be in the form of powder or putty.**

Attention is directed to the fact (pointed out by the Applicants) that the reinforcing phase always consists two components as: (A) a lofty and fibrous material (see paragraph 0049 for many choices, one option is polytetrafluoroethylene (PTFE)) and (B) **metal wire mesh and/or carbon fiber cloth** (see paragraph 0015 and also see **batting** in all Figures 1-6). As pointed out by the

Applicants, **Stepanian’s aerogel “as starting material” is only in the form of “monolith”** rather than powder. Even both forms (powder and monolith) of aerogel may be used (at least not being ruled out) in building Stepanian’s composite so that Stepanian is able to make such a conclusion in paragraph 0010 and 0011 for obtaining exceptionally low thermal conductivity, Stepanian’s final product will not be in the form of powder or putty.

Art Unit: 1713

With respect to 103(a) rejection, primary reference **Frank** only discloses a method of making **aerogel composite materials** comprising (A) at least one layer of bicomponent fiber web material and (B) aerogel particles. Such a composite material in working examples 1 and 2 has a low thermal conductivity around 23 mW/m K. Therefore, Frank is still silent about using a **polytetrafluoroethylene (PTFE)** as bicomponent fiber web material as well as such an insulation product is in the form of powder or putty. Secondary reference **Stepanian** can only fix some but not all deficiency of Frank (see page 13 of Remarks).

9. In a close examination of three references cited in the **search report for Applicants'** **PCT/US2004/032686 (now WO 2005/047381 A1)**, the examiner confirms that **EP 552,484 A to Mielke et al. (or its equivalent DE 42-01-306 A1 and US 5,294,480) (cited as X)**, **EP 672,635 A to Mielke et al. (cited as A reference)**, and **WO 9832709 A to Schwertfeger et al. (cited as A reference)**, all fail to teach or fairly suggest such a combination of limitations. To be more specific, "480" (or "484" or "306") relates to a molding can be first prepared from aerogel and then laminated the surface with transparent plastic sheet or film of many polymers including PTFE. It is not a composite material. No weight ratio is disclosed. With respect to "635" and "709", only silica-aerogel is used with no PTFE included. **All are not in the form of powder or putty.**

It is noted by this examiner that both form and weight ratio related to aerogel material have been shown to be critical so as to reach the claimed final form of powder or putty. The present invention has shown in examples along with some comparative examples for making

Art Unit: 1713

such a PTFE-aerogel composite with such a very low thermal conductivity but **without any batting** (see pages 19-26 for examples 1-12 with control along with its **Figures 1-10**).

Therefore, all the above-mentioned references, in combination or alone, does not teach or fairly suggest the limitations of present invention.

10. After further examination and search, the examiner found the following prior art did not teach the claimed limitation: **US Patent No. 6,068,882 to Ryu** only discloses a method of making a flexible aerogel useful for superinsulation by forming aerogels interstitially within a fiber matrix with the condition that the composite structures have substantially no fiber-fiber contacts (abstract, line 1-7; column 4, line 59-67). The key point is that fibrous materials are alumina, silica, silicon carbide and the like. **No PTFE is used at all. The composites are not in the form of powder or putty.** Therefore, Ryu fails to teach or fairly suggest the limitation of present invention.

11. The key issue, regarding a PTFE-aerogel composite with such a very low thermal conductivity and **without any batting** can be made by selecting the right form of aerogel material as well as the right weight ratio, cannot be overcome by any or the combination of the above references, therefore, the present invention is novel.

12. As of the date of this office action, the examiner has not located or identified any reference that can be used singularly or in combination with another reference including the above references to render the present invention anticipated or obvious to one of the ordinary

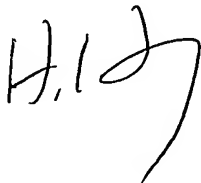
Art Unit: 1713

skill in the art. Therefore, parent composition **Claims 1** is allowed for the reason listed above.

Since the prior art of record fails to teach the present invention, the remaining pending dependent

Claims 2-4, 6-9, 11-12, 14 and 16-17 are passed to issue.

13. Any inquiry concerning this communication or earlier communication from the examiner should be directed to **Dr. Henry S. Hu** whose telephone number is **(571) 272-1103**. The examiner can be reached on Monday through Friday from 9:00 AM –5:00 PM. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David Wu, can be reached on (571) 272-1114. The fax number for the organization where this application or proceeding is assigned is **(571) 273-8300** for all regular communications. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



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